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THE GENUS *HAMINOEA* TURTON & KINGSTON, 1830 (OPISTHOBRANCHIA, BULLOMORPHA) IN THE SOUTHEAST OF SPAIN WITH THE DESCRIPTION OF A NEW SPECIES (****)

KEY WORDS: *Haminoea*; Bullomorpha; Opisthobranchia; Spain.

Abstract

Four species belonging to the genus *Haminoea* have been found in the Southeastern coast of Spain: *H. hydatis, H. navicula, H. orbignyana* and a fourth one new for science, *H. orteai* n. sp.. The shell, the external morphology and the most significative anatomic characteristics are described for each species. The penis morphology and the prostatic gland show the greatest interespecific differences and are the more useful characters in the taxonomy of the genus.

Riassunto

Lungo le coste sud-orientali spagnole sono state trovate quattro specie appartenenti al genere *Haminoea: H. hydatis, H. navicula, H. orbignyana* e la nuova specie *H. orteai*. Per ogni specie si descrive la conchiglia, la morfologia esterna dell'animale e si indicano le caratteristiche più significative dell'anatomia interna. Il pene e la ghiandola prostatica sono gli elementi che hanno mostrato maggiori differenze fra queste quattro specie: essi costituiscono le caratteristiche più utili nella tassonomia di questo genere.

Introduction

The genus *Haminoea* TURTON & KINGSTON, 1830 is distributed widely within temperate and tropical seas. These are largely nocturnal animals (pers. obs.) usually occurring in muddy bottoms, mainly in littoral areas.

PILSBRY (1893) offers a list of about 50 species of *Haminoea*, and according to RUDMAN (1971), since then at least 20 species more have been described. Nevertheless, in most cases only the shell has been described, but the shell is often useless by itself alone to distinguish species.

The genus *Haminoea* is characterized by its globular, fragile and translucent shell, without a projecting spire, and covered with a thin periostracus. The animal can retract inside the shell almost completely.

It shows a well developed cephalic shield with a truncated front part and generally a bilobed rear part. Under the cephalic disc and at both sides of the body are the Hancock's organs of lamellar structure. The eyes can be seen in the disc tegument. The mantle is rudimentary and is covered by the shell. It shows a palial lobe that projects from the rear. The foot is short with two parapodial lobes that cover the shell partially.

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The jaws (labial armature) are small with a crescent shape and their surface is formed by small rodlets standing one by another. The gizzard is muscular with three chitinous plates, curved and with transversal folds in their convex side. The multiserial radula has variable number of rows. Each row has a trapezoidal central tooth with a central cusp and two or more denticles on each side (MARCUS, 1972), and many hook-shaped lateral teeth, from which the innermost of each row shows denticulation at the edge.

This genus belongs to the well-known family Atyidae THIELE, 1926. BURN (1978) suggested that this family name be replaced by Haminoeidae PILSBRY, 1895 due to two reasons: firstly, the second of these names has priority over the first one; secondly, Atyidae THIELE, based upon the taxon *Atys* MONTFORT, 1810 is a junior homonym of Atyidae BOUVIER, 1925, freshwater family of Crustacea Decapoda (based upon the taxon *Atya* LEEACH, 1816).

According to RUDMAN (1971), the herbivorous habits of the *Haminoea* species as well as its reproductive system are more similar to that of *Aplysia* than to other Bullomorpha. However, in the reproductive system of *Haminoea* the prostate is directly associated with the penis rather than with the anterior gonoduct, as is the case in *Aplysia* (RUDMAN, 1971). The nervous system of *Haminoea* is quite similar to that of *Atys* and *Smaragdinella* (RUDMAN, opus cit.). The same author (RUDMAN, 1972) places the family Haminoeidae along with Smaragdinellidae and Bullactidae in the superfamily Atyoidea.

This genus can be found in the literature spelled in three different forms: *Haminea*, *Haminaea* and *Haminoea*. In our opinion, the original name transcription should be *Haminoea*, just as it appears in a considerable part of the bibliography. The spelling *Haminea* comes from Leach's handwriting published by GRAY (1847) (see JEFFREYS, 1867: 437; and AARTSEN, MENHORST & GITTENBERGER, 1984: 47).

PIANI (1980) records five *Haminoea* species in his catalogue of the marine molluscs of the Mediterranean Sea: *Haminoea hydatis* (LINNÉ, 1758), *H. navicula* (DA COSTA, 1778), *H. orbignyana* (Férussac, 1822), *H. elegans* LEACH, 1852, and *H. cymoelium* MONTEROSATO, 1923. The latter three species are known only by their shell. There has been a great confusion on their taxonomy due to the lack of data from the soft parts of the animals, which are very important to establish differences among species.

During the last years we have collected several hundreds of specimens belonging to this genus in some localities in the Southeast of Spain, having studied the shell, external morphology and anatomical details of the animals, egg masses, development and life cycles. As a result of this research we have clearly differentiated four species: *H. hydatis*, *H. navicula*, *H. orbignyana*, and a fourth one we consider new for science.

In this survey we describe the result of the morphological and anatomical study to these four species, emphasizing the more important differencial characters. Data on the egg masses, development and life histories will be described in a subsequent publication.

Descriptions

Haminoea hydatis (Linné, 1758).

Bulla hydatis Linn, 1758: 726.
Bulla pisum Delle Chiaje, 1841: 26.
Haminea subpellucida H. Adams, 1869: 19.

Material. - Salinas del Rasall (37° 36' N, 0° 45' W), several samples of more than 25 specimens each in muddy bottoms (0-1 m deep), between 1980 and 1981. Mar Menor (37° 43' N, 0° 49' W), several samples of more than 25 specimens each in muddy bottoms (0-6 m deep), between 1980 and 1981. Cabo de Palos (37° 38' N, 0° 42' W), 22 specimens in muddy bottoms covered by *Cymodocea nodosa-Caulerpa prolifera* beds (0-5 m deep), between 1980 and 1981. Salinas de Torrevieja (38° 00' N, 0° 43' W), 14 specimens (19.VIII.1984), 11 specimens (30.III.1985), all of them in muddy bottoms (0-1 m deep).

Maximum size: 21 mm (animal), 13 mm (shell).

Description

A detailed description of this species can be seen in Vayssière (1885), Tchang-Si (1931) and Thompson (1976 and 1981).

The shell is subglobular, fragile, translucent, with a sunken spire. The aperture is slightly longer than the length of the shell (fig. 1). The surface is smooth with delicate growth lines and it is covered with a thin clear yellow-green speckled periostracum. In the samples of studied specimens the shell shows slight variability in the sizes and length/width ratio of the shell and of the aperture.

The cephalic shield is deeply bilobuled in its posterior end. The eyes are in two non-pigmented areas of the tegument. The parapodial lobes are little developed and cover the shell laterally, while its rear part is concealed by the external posterior palial lobe. The background body color is light fawn with dense dark mottling, which gives grey aspect to the whole. Orange and white specks can be seen through the shell in the mantle area.

The two lobes of the prostatic gland are separated by a narrow and cylindrical zone (fig. 2). Both of them are similar in size and have more or less spherical shape. The prostatic duct is relatively short. The penis is unarmed, cylindrical, with the apical part with smaller diameter section and fusiform (fig. 3). The dorsal outline of the gizzard plates is more or less rectangular (fig. 4B) and its dorsal surface has few (13-17) smooth folds (fig. 4 A). The radula is the typical of the genus (fig. 21) and its formula in the studied specimens is n x 14-31.1.31-14.

Distribution

Eastern Atlantic, from British Isles to Ascension and Saint Helena; Mediterranean Sea.

Remarks

The shell variability of this species has led malacologists to describe numerous forms within it and many times to mistake it with juveniles of *H. navicula*. The species *H. elegans* Leach, 1852 and *H. cymoelium* Monterosato, 1823, only described by the shell, could be *H. hydatis*, but to verity this point it would be necessary to study the soft part of the animals.

H. elegans Leach, 1852 is a junior homonym of *H. elegans* (Gray, 1825), western Atlantic species from which there are some doubtful citations in Northeastern Africa (e.g. Nicklés, 1950; Garcia-Talavera, 1983). Nordsieck & Garcia-Talavera (1979) record *H. elegans* in Canary Islands, giving Gray as the author, but remarking the date of Leach's description: 1852.

Besides, *H. hydatis* has often been mistaken with *H. navicula*. For example, Vayssière (1880) mentions only one species of *Haminoea: H. hydatis*, however, the nervous and reproductive system that he represented belong in fact to *H. navicula*. It led to mistake later authors, so Thompson (1976: 119) shows the nervous system of this last species giving it to *H. hydatis*. In later paper Vayssière (1885) mentions *H. hydatis* and *H. cornea* (synonym of *H. navicula*) and describes correctly both species.

For all these reasons we believe that some references of these species must be questioned.

Haminoea navicula (Da Costa, 1778)

Bulla navicula Da Costa, 1778: 28.
Bulla cornea Lamarck, 1822: 36.
Bulla folliculus Menke, 1853: 141.

Material - Salinas del Rasall (37° 36' N, 0° 45' W), several samples of more than 20 specimens each in muddy bottoms (0-1 m deep) during 1982. Mar Menor (37° 43' N, 0° 49' W), more than 30 specimens on muddy bottoms (0-2 m deep), between June and September of 1981. Salinas de Torrevieja 38° 00' N, 0° 43' W), two samples of more than 10 specimens each in 1984, and one sample of 16 specimens in 1985; all of them in muddy bottoms (0-1 m deep).

Maximum size: 50 mm (animal), 24 mm (shell).

Description

A detailed description of this species can be seen in Vayssière (1885), Guiart (1901), Tchang-Si (1931) and Thompson (1976).

The shell is globose, fragile, translucent and little yellowish, with a sunken spire. Its surface has growth lines crossed by thin spiral striations. The aperture is wider than in *H. hydatis* (fig. 5). The periostracum varies from yellow to orange-fawn.

The cephalic shield is trapezoidal and bilobed in its posterior end. The parapodial and palial lobes are more developed than in *H. hydatis* and the shell is almost totally covered by them. The background body color is fawn with dark grey punctuation. A thick orange spot can often be observed between the eyes.

The two prostatic lobes are different in size, the distal one being nearly twice the size of the proximal (fig. 6). The prostatic duct is very short and thick. The penis is more or less cylindrical with a blunt apical zone (fig. 7) which has a spiculose anterior side.

The dorsal surface of the gizzard plates shows few (8-12) grooves (fig. 8 A). Its dorsal outline is triangular (fig. 8 B). The radula is very similar to the one of *H. hydatis* (see THOMPSON, 1976: 120, fig. 59 i; TORTORICI & PANETTA, 1977: 255, fig. 1). The radular formula is n x 22-39.1.39-22 in the studied specimens.

DISTRIBUTION

Eastern Atlantic, from the British Isles to Gibraltar; Mediterranean and Black Sea.

REMARKS

(See the discussion of the previous species).

Haminoea orbignyana (FÉRUSSAC, 1822)

Bulla orbignyana FÉRUSSAC, 1822.
Haminea dilatata LEACH, 1852: 42.
Haminaea temarana PRUVOT-FOL, 1953: 29.

MATERIAL - Salinas del Rasall (37° 36', 0° 45' W), several samples of more than 20 specimens each in muddy bottoms (0-1 m deep), between 1982 and 1984. Mar Menor (37° 45' N, 0° 50' W), 14 specimens in muddy bottoms with *Caulerpa* beds (0-2 m deep), between June and September of 1981. Salinas de Torrevieja (38° 00' N, 0° 43' W), 12 specimens (30.III.1985), in muddy bottoms (0-1 m deep).

Maximum size: 35 mm (animal), 20 mm (shell).

DESCRIPTION

Of the four *Haminoea* species found in the Southeast Spain, this is the only one that can be distinguished clearly by its shell. It shows a notably wider aperture at the lower part than in the other species (fig. 10). The shell is fragile, hyaline, with visible growth lines. The external lip is longer than the lenght of the shell. Its outline is distinguished because it is very wide at its central zone and narrow at the apical one. The inner lip is opaque white. The periostracum is orange-colored.

The cephalic shield is trapezoidal with rounded and slightly bilobed posterior end (fig. 9). The eyes are placed in nonpigmented areas of the tegument. The parapodial lobes are well developed but don't meet mid-dorsally over the shell. The upper edge of the palial lobe is little developed.

The background body color is variable, generally light fawn in young specimens and greenish in the adult ones. Orange and brown spots are disseminated all over the body and there are white spots in the palial lobe. The upper edges of the parapodial lobes and the lateral edges of the cephalic shield are pigmented with a dark green-brown color. There is also a triangular area of this color from the eyes to the anterior edge of the cephalic shield (see fig. 9).

The proximal lobe of the prostatic gland is wrinkled and bigger than the distal one (fig. 12). The prostatic duct is very long, thin and twisted. It is longer than in the other three species studied. The penis is unarmed with a triangular section at the apical zone and a little sharpened tip (fig. 13).

The gizzard plates have a rectangular dorsal outline (fig. 11 B) and its dorsal surface is almost smooth (fig. 11 A). The jaws are similar to the ones in *H. hydatis* and *H. navicula*, with a crescent shape. The radula differs from that of other members of the genus as it lacks any denticulation on the innermost lateral teeth (fig. 22). The radula formula is n x 20-28.1.28-20

Distribution

Eastern Atlantic, from the French coast to Cape Verde Islands; Mediterranean.

Remarks

Ferro & Russo (1981) point out that the shells of *Haminoea* they found in Lago di Fusaro (near Naples) show a continuous variation that would embrace the typical forms of the three Mediterranean species: *H. hydatis*, *H. navicula* and *H. orbignyana*. These authors believe that this last species may be a variant of *H. hydatis*, but have not studied live animals.

Ballesteros (1984) records two specimens of *H. navicula* in Cubellas (NE Spain), but the description and figure (p. 42 and fig. 1) he includes of the shell and animal are like that of *H. orbignyana*. Therefore we believe it is this species. The only difference observed with respect to our specimens is that in those described by this author the parapodial lobes meet mid-dorsally over the shell, a detail we have not observed in our specimens.

Pruvot-Fol (1953) described a new species, *Haminaea temarana*, in Morocco; however, the description as well as the figure (pl. III, fig. 5) fit into the characters described for *H. orbignyana*. Therefore we consider the first of these names a junior synonym of the second one. The shell which is represented by this author (p. 29, fig. 3) is like that of the juvenile shells of *H. orbignyana*.

Haminoea orteai n. sp.

Material - Salinas del Rasall (37° 36' N, 0° 45' W), several samples of more than 15 specimens each in muddy bottoms (0-1 m deep), between 1982 and 1984. Mar Menor (37° 43', 0° 46' W), 7 specimens in muddy bottoms (0-4 m deep), in September of 1983. Salinas del Cabo de Gata (36° 49' N, 0° 42' W), 26 specimens (27.VII.1983) in muddy bottoms (0-1 m deep). Cabo de Palos (37° 38' N, 0° 42' W), 2 young specimens (21.VIII.1984). in shell gravel with mud (30 m deep).

Maximum size: 45 mm (animal), 24 mm (shell).

Type material - A complete specimen, whose size was 42 mm alive, has been choosen as holotype. It was collected in Salinas del Rasall. Three shells, from the same locality, of 16, 17 and 19 mm of lenght have been choosen as paratypes. The four type specimens have been placed in the Museo Nacional de Ciencias Naturales, in Madrid (Spain) (catalogue number: 12-09/1007), along with a slide of the animal alive, which corresponded to holotype.

Description

The shell is bulled, slightly globular, and its width/lenght ratio (nearly 0,6) is smaller than in the other three species formely described. It is very fragile, translucent, with distinct growth lines, and with a sunken spire. The periostracum is very thin, transparent and almost imperceptible which is seldom kept in the empty shells. The external lip protrudes slightly of the shell in its upper part (fig. 16).

The cephalic shield is trapezoidal with the posterior end slightly bilobed due to the presence of a small incision. The parapodial lobes are short and high. They cover the anterior part of the shell and it meet middorsally (fig. 15). The rear edge of the palial lobe is irregular. The background color varies from light fawn to grey with black, dark brown, and white specks. It lacks unpigmented periocular areas.

The Hancock's organ have from 12 to 14 leaves in the specimens dissected. The two lobes of the prostatic gland have a semispherical shape and smooth surface, with the proximal one smaller than the distal (fig. 18). The prostatic duct is longer than that of *H. hydatis* and *H. navicula* and shorter than in *H. orbignyana*. The penis is more or less cylindrical with an apical crest divided into two lobes (fig. 19).

The jaws are arch-shaped and asymmetrical (fig. 20) unlike in the other three species, where they are symmetrical (see in fig. 14 the jaws of *H. orbignyana*). The radula is very similar to those of *H. hydatis* and *H. navicula*, with the innermost lateral teeth of each row with denticulated edge (fig. 23). The radular formula in more than 15 specimens dissected is n x 26-32.1.32-26. The dorsal outline of the gizzard plates is rectangular with round rear end (fig. 17 B). They have between 30 and 32 folds in their dorsal surface (figs. 17 A 25 and 26).

Distribution

It is certainly known in the localities mentioned in the section of studied material: coast of Murcia and Almería provinces (SE Spain), though we think that its distribution might be much wider, but it may has been mistaken with *H. hydatis* and *H. navicula*, as it is commented below.

Derivatio nominis

The name of this new species is dedicated to our friend Dr. Jesús Ortea because of his constant help and encouragement since our beginnings in the study of the Opisthobranchs.

Remarks

Haminoea orteai is clearly distinguished from the other three european species of the genus by several characters. Its shell can not be used as only defining feature because it can be easily confused with juveniles of *H. navicula* and with wider aperture forms of *H. hydatis*. The shell of *H. orbignyana* is clearly different (see fig. 10 and 16), because is more globular (the width/lenght ratio is nearly 0,75 in *H. orbignyana* and nearly 0,60 in *H. orteai*).

The animal of *H. orteai* differs because it doesn't have the eyes in non-pigmented areas of the cephalic shield tegument, as they are in the other three species. The parapodial lobes are shorter than the ones in *H. navicula* and *H. orbignyana* and clearly higher than the ones of *H. hydatis*, where they never meet dorsally.

The gizzard plates have a longer number of dorsal folds than the other three species. The radula is similar to *H. hydatis* and *H. navicula* and differs from the one in *H. orbignyana* because this last shows non-denticulated innermost lateral teeth.

The prostatic gland is clearly different from those of *H. hydatis* and *H. orbignyana* (see figs. 2, 12 and 18) and similar to the one in *H. navicula*, but it is distinguished from this last because it is somewhat more spherical and because it shows a notably longer prostatic duct. Besides, the muscle which fastens the prostate to the right wall of the body is inserted in the prostatic duct, while in the other three species it is inserted directly in the prostatic gland (see figs. 2, 6, 12 and 18). Last, the lobes on the penis are one of the most obvious characters distinguishing *H. orteai* from the others.

H. orteai is also clearly different from the *Haminoea* species of the Western Atlantic, being *H. elegans* (Gray, 1825) the most similar in the external features (see Marcus & Marcus, 1967; Marcus, 1972; Thompson, 1977). The former is distinguished because it shows a cephalic shield slightly bilobed (in *H. elegans* it is entire), and because the parapodial lobes are short (only developed in their anterior part). The most obvious difference in the internal anatomy occurs in the penis, which in *H. elegans* has numerous transverse folds each bordered with a row of cuticular pegs (Marcus & Marcus, 1967).

Pruvot-Fol (1953) described two species of *Haminoea* in the coast of Morocco: *H. temarana* and *H. gantesae*. We have already mentioned that we consider the former as a junior synonym of *H. orbignyana* and we think that the latter might be really a juvenile of *H. hydatis*, though the briefness of the description doesn't permit to affirm it with certitude.

Thompson (1976, p. 120, fig. 59 f) and Thompson & Brown (1976, p. 25, fig. 8 C) give a figure of the prostate of *H. navicula* that probably belongs to *H. orteai*. In a later paper Thompson (1981, p. 74, fig. 1 d) gives a correct figure of the prostate of the former species. For this reason we think among the specimens of *H. navicula* studied by Thompson he had also specimens of the species that we describe here as new: *H. orteai*.

The shell described and figured by Nordsieck & Garcia-Talavera (1979, p. 176, pl. XLIV, fig. 37) as *H. elegans* Gray, is quite similar to the one of *H. orteai* and it could belong to this species. The same occurs with the shells that Ferro & Russo (1981, pl. 2, fig. 8) attribute to intermediate forms between *H. hydatis* and *H. orbignyana*. In both cases it would be necessary to study living animal to identify it certainly.

For all this reasons we think that *H. orteai* might have a wider range of distribution that would overlap with that of the other three european species of *Haminoea*, but it could have been mistaken with them previously.

Discussion and conclusions

We consider that the four *Haminoea* species found in the Southeast of Spain and studied here are the only valid members of the genus along the European coasts: *H. hydatis* (L., 1758), *H. navicula* (Da Costa, 1778), *H. orbignyana* (Férussac, 1822), and *H. orteai* n. sp. These species can be differentiated without problem if live animals are in use. The shell can not be used as unique defining characteristic. Only *H. orbygniana* can be clearly distinguished from the other species by its shell. In the other three species the shell shows variability from young specimens to the adult ones and even among populations of the same species and the identification is difficult in many cases.

According to Rudman (1971), the color of the animal is constant in some species and can be used as a taxonomic character, but in other cases it shows great variability. Some variability has been observed in the four species studied here. Edlinger (1982) describes the colour adaptations of the animal in *H. navicula* according to the substrate and he points out that this can vary even in the same specimen by pigment migration and by extension and contraction of melanophores. The shape of the parapodia, palial lobe, and cephalic shield can be used to help to distinguish the species.

The digestive system is very constant in all the species of the genus. The labial armature (or jaws) are almost indistinguishable from one species to another except for microstructure characters. In the four species studied, asymmetrical jaws can be observed only in *H. orteai*. The gizzard plates are quite similar in all the species, though they can be differenciated in little details from one to another. The radula should not be used in

this genus as specific character in many cases. Only the radula of *H. orbignyana*, of the four studied species, can be clearly differenciated by the lack of denticulation in the inner lateral teeth of each row. In the other three species we have observed that the interspecific variations on the radulae are, at the very last, of the same magnitude that the intraspecific ones. The numbers of teeth rows, as well as the number of lateral teeth, increase with age. The denticulation of the innermost lateral tooth can not be observed in the first rows of teeth.

The main specific differences from the anatomic point of view are in the penis and prostate associated to it. This characters should be used for the right determination of the species wherever it is possible.

The development and life histories have been poorly studied up to now in the genus *Haminoea*. These aspects can give a useful extra information in the taxonomy of these species. We have also studied these aspects in our four *Haminoea* species, having found notable differences among them which ratify the separation based on morphological and anatomic characters. All the data referring to the development and life cycles will be described in a subsequent paper which is in preparation.

Acknowledgments

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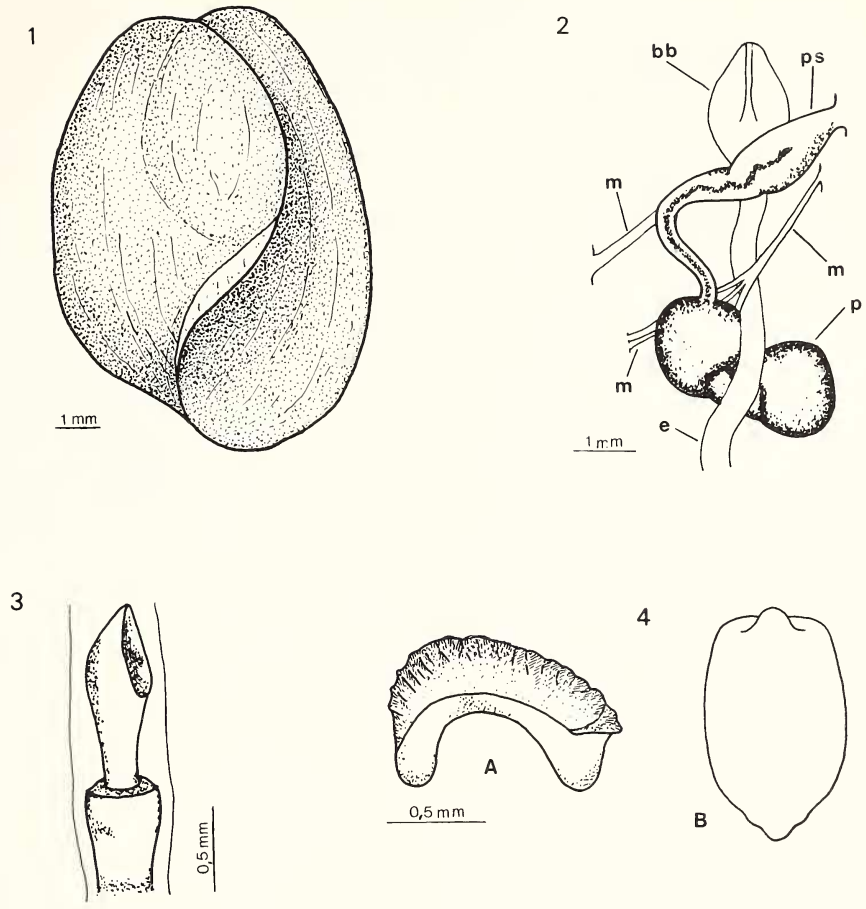
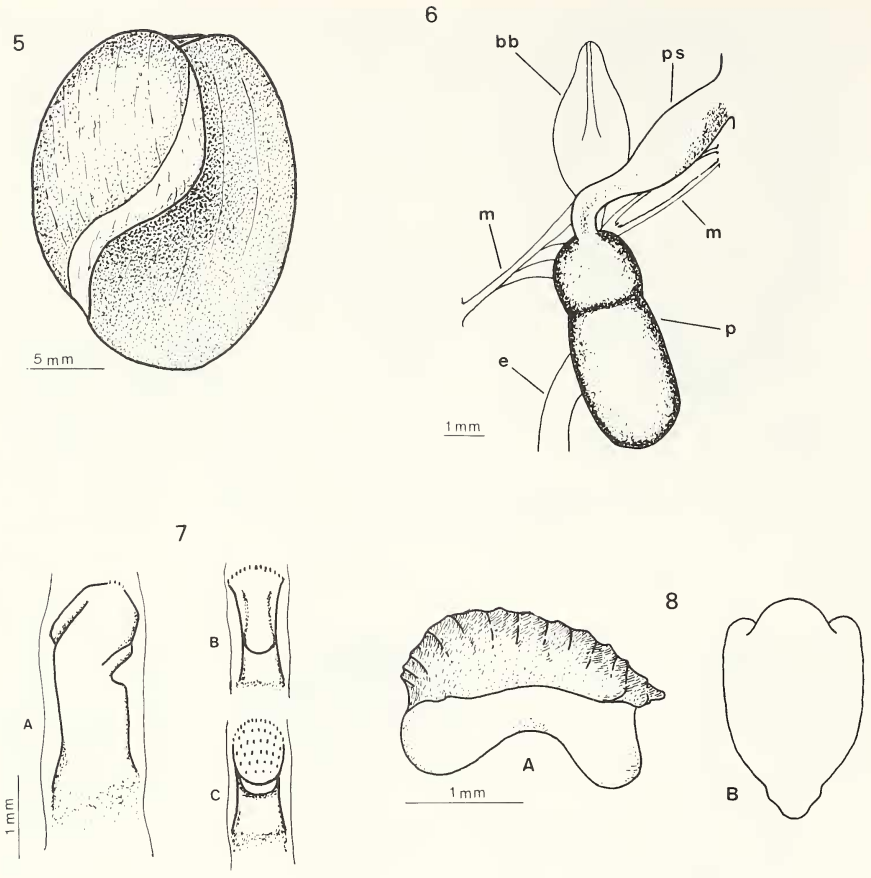
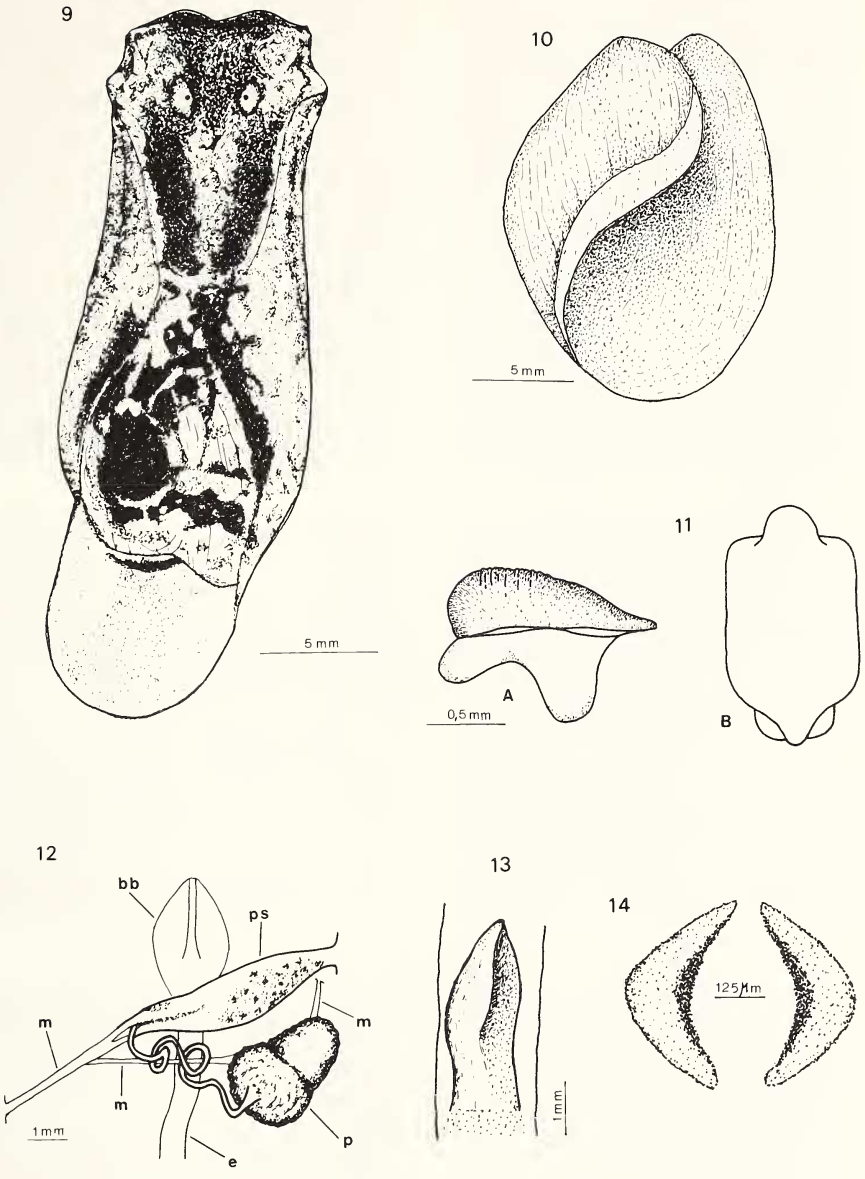


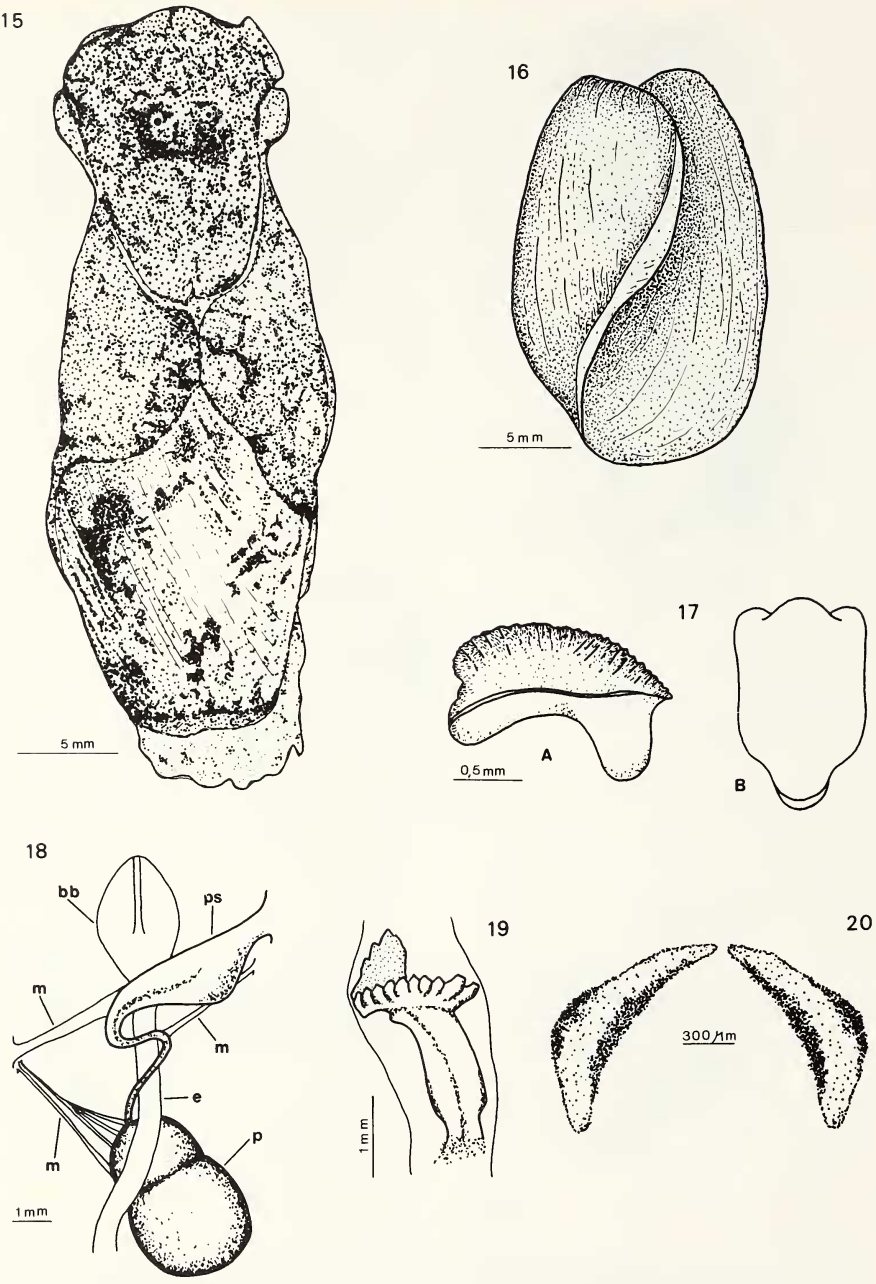
Figs. 1-4. *Haminoea hydatis* (L.). **1,** shell; **2,** dissection to show the prostatic gland (**bb,** buccal bulb; **e,** esophagus; **m,** muscle; **p,** prostate, **ps,** penial sheath); **3,** penis; 4, gizzard plate (A, lateral view; B, outline in dorsal view).



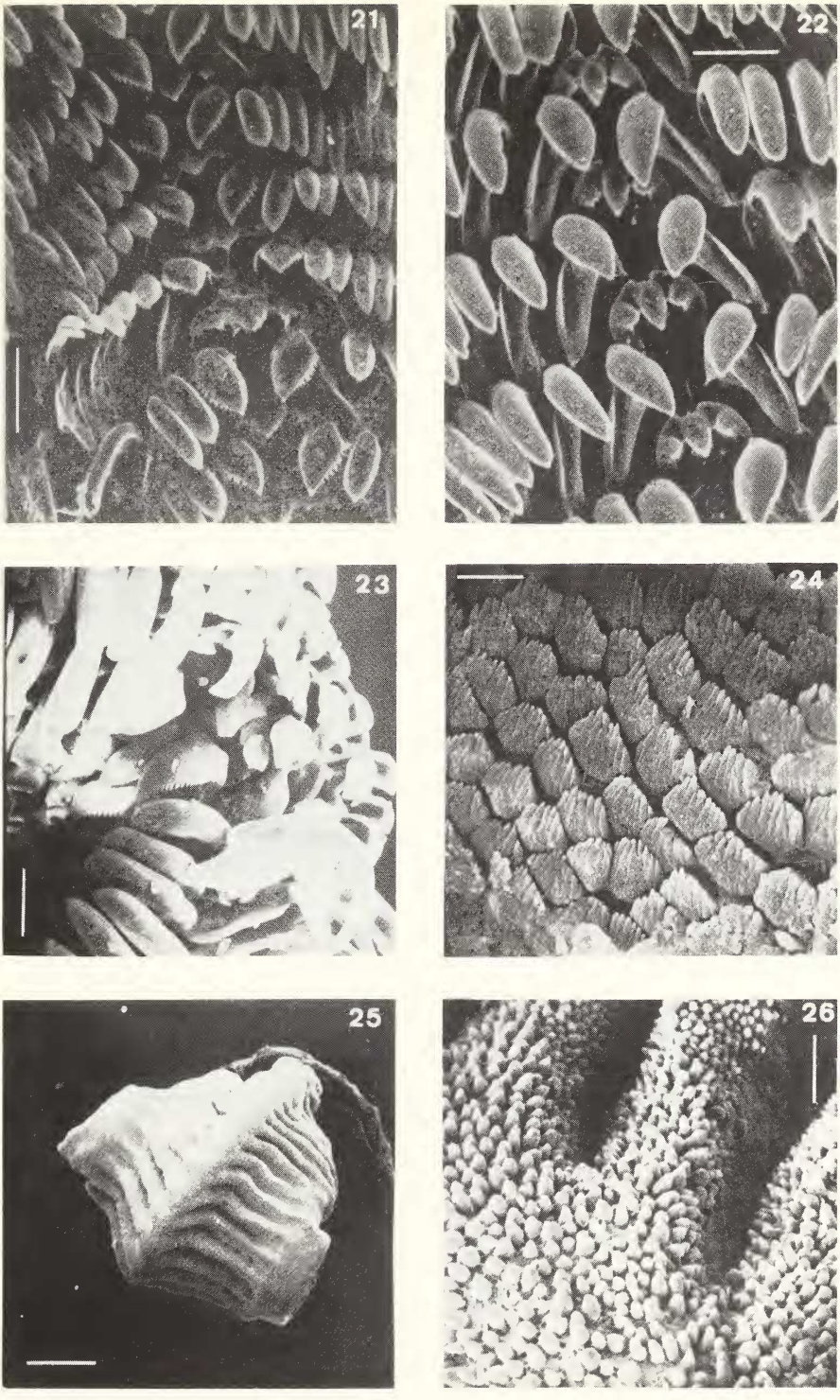
Figs. 5-8. *Haminoea navicula* (Da Costa). **5,** shell; **6,** dissection to show the prostatic gland (**bb,** buccal bulb; **e,** esophagus; **m,** muscle; **p,** prostate; **ps,** penial sheath); **7** penis (A, lateral view; B, posterior view; C, anterior view); **8,** gizzard plate (A, lateral view; B, outline in dorsal view).



Figs. 9-14. *Haminoea orbignyana* (FÉRUSSAC). **9,** dorsal view of the complete animal; **10,** shell; **11,** gizzard plate (A, lateral view; B, outline in dorsal view); **12,** dissection to show the prostatic gland (**bb,** buccal bulb; **e,** esophagus; **m,** muscle; **p,** prostate; **ps,** penial sheath); **13,** penis; **14,** jaws.



Figs. 15-20. *Haminoea orteai* n. sp.. **15,** dorsal view of the complete animal; **16,** shell; **17,** gizzard plate (A, lateral view; B, outline in dorsal view); **18,** dissection to show the prostatic gland (**bb,** buccal bulb; **e,** esophagus; **m,** muscle; **p,** prostate; **ps,** penial sheath); **19,** penis; **20,** jaws.



Figs. 21-26. **21,** radula of *Haminoea hydatis* (L.) (scale bar 50 μm); **22,** radula of *Haminoea orbignyana* (FÉRUSSAC) (scale bar 50 μm); **23-26,** *Haminoea orteai* n. sp.. **23,** radula (scale bar 20 μm); **24,** detail of the jaw (scale bar 10 μm); **25,** gizzard plate (scale bar 0,2 mm); **26,** detail of the gizzard plate (scale bar 20 μm).

REFERENCES CITED

AARTSEN J.J. Van, MENKHORST, H.P.M.G. & GITTENBERGER E., 1984. The marine Mollusca of the Bay of Algeciras, Spain, with general notes on *Mitrella*, Marginellidae and Turridae. *Basteria*, suppl. **2:** 1-135, pls. 1-24.

BALLESTEROS M., 1984. Adición a la fauna de opistobranquios de Cubelles (Tarragona). *Miscellània Zoològica*, **8:** 41-49.

BURN R., 1978. A review of Australian species of *Austrocylichna, Nipponatys, Cylichnatys* and *Diniatys* (Mollusca: Gastropoda: Haminoeidae). *Journal of the Malacological Society of Australia*, **4:** 93-112.

EDLINGER K., 1982. Colour adaptation in *Haminea navicula* (DA COSTA) (Mollusca-Opisthobranchia). *Malacologia*, **22:** 593-600.

FERRO R. & RUSSO G.F., 1981. Aspetti di particolare interesse nella malacofauna del Lago Fusaro. *Bollettino Malacologico*, **17** (7-8): 191-198.

GARCIA-TALAVERA F., 1983. *Los moluscos gasterópodos anfiatlánticos. (Estudio paleo y biogeográfico de las especies bentónicas litorales).* Secretariado de Publicaciones de la Universidad de La Laguna. Colección Monografías n° 10, pp. 351, pls. 7.

GRAY J.E., 1847. The classification of the British Mollusca by W.E. Leach, M.D. *Annual Magazine of Natural History*, (1) **20:** 267-273.

GUIART J., 1901. Contribution à l'étude des gastéropodes opisthobranches et en particulier des céphalaspides. *Mém. Soc. zool. France*, **14:** 5-219.

JEFFREYS J.G., 1867. *British conchology.* Vol. 4. London, van Voorst, pp. 486.

MARCUS Ev., 1972. Notes on some opisthobranchs gastropods from the Chesapeake Bay. *Chesapeake Science*, **13:** 200-217.

MARCUS Ev. & MARCUS Er., 1967. *American Opisthobranch Mollusks.* Studies in Tropical Oceanography, Institute of Marine Sciences, Miami, **6,** pp. 256.

NICKLÉS M., 1950. *Mollusques testacés marins de la côte occidentale d'Afrique.* Manuels ouest-africains, 2. Lechevalier Ed., Paris, pp. 269.

NORDSIECK F. & GARCIA-TALAVERA F., 1979. *Moluscos marinos de Canarias y Madera (Gastropoda).* Aula de cultura de Tenerife, pp. 208, pls. XLVI.

PIANI P., 1980. Catalogo dei molluschi conchiferi viventi nel Mediterraneo. *Bollettino Malacologico*, **16** (5-6): 113-224.

PILSBRY H.A., 1893. *Manual of Conchology* vol. 15. Academy of Natural Sciences, Philadelphia, pp. 64.

PRUVOT-FOL A., 1953. *Etude de quelques opisthobranches de la côte Atlantique du Maroc et du Sénégal.* Travaux de l'Institut Scientifique Chérifien, Tanger, pp. 105, pls. III.

RUDMAN W.B., 1971. On the opisthobranch genus *Haminoea* TURTON & KINGSTON. *Pacific Science*, **25:** 545-559.

RUDMAN W.B., 1972. The herbivorous opisthobranch genera *Phanerophthalmus* A. ADAMS and *Smaragdinella* A. ADAMS. *Proceedings of the Malacological Society of London*, **40:** 189-210.

TCHANG-SI, 1931. *Contribution à l'étude des mollusques opisthobranches de la côte provençale.* Thèses de la Faculté des Sciences de l'Université de Lyon, pp. 211, pls. VIII.

THOMPSON T.E., 1976. *Biology of Opisthobranch Molluscs.* Vol. I. The Ray Society, London, pp. 207, pls. 21.

THOMPSON T.E., 1977. Jamaican Opisthobranch Molluscs. *The Journal of Molluscan Studies*, **43:** 93-140.

THOMPSON T.E., 1981. Taxonomy of three misunderstood Opisthobranchs from the Northern Adriatic Sea. *The Journal of Molluscan Studies*, **47:** 73-79.

THOMPSON T.E. & BROWN G.H., 1976. *British Opisthobranch Molluscs.* Synopses of the British Fauna (New Series), N° 8, Academic Press, London, pp. 203, pl. I.

TORTORICI R. & PANETTA P., 1977. Notizie ecologiche su alcuni opistobranchi raccolti nel Golfo di Taranto. *Atti Soc. ital. Sci. nat. Museo civ. Stor. nat. Milano*, **118** (2): 249-257.

VAYSSIÈRE A., 1880. Recherches anatomiques sur les mollusques de la famille des Bullidés. *Annales Sciences Naturelles*, Zoologie, **9:** 1-123, pls. 12.

VAYSSIÈRE A., 1885. Recherches sur les Mollusques Opisthobranches du Golfe de Marseille. *Annales du Muséum d'Histoire Naturelle*, Marseille, Zoologie, **2** (3): 1-181.